

# Stroke Case Study: EMS, CAH, and Tertiary working together

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# Patient Information

- 30 y.o. Female
- Health History:
  - Migraine
  - Asthma
  - Cholecystectomy
- Medications:
  - norethindrone-ethinyl estradiol (JUNEL FE 1/20) 1-20 MG-MCG per tablet
  - Maxalt
  - Multivitamin

# Patient Scenario

- Patient's husband gives the history of the patient washing her hair in the bathtub. Then she was sitting trying to get dressed and could not get her socks on. She actually could not get them unfolded and then she kind of fell onto the floor. There was no loss of consciousness. The husband carried her to the car.

# Patient Scenario

- Patient arrived to CAH by private vehicle with husband. Patient was unable to get out of car by herself.
- Complains of headache to right temporal area, 3/10.
- + Left sided weakness
- + Facial Drooping.
- + Speech garbled
- Vitals:
  - HR 95 ~ Resp 14 ~ BP 123/78 ~ 98%RA

# Information obtained from Critical Access Hospital

- Patient arrived at CAH : 0816
- Last Known Well: 0740
- To CT: 0818
- Back from CT: 0821
- EKG complete: 0827
- Blood Sugar: 86 at 0829
- NIH Stroke Scale =10 at 0830
- CT confirmed negative at 0837

# NIH Stroke Scale

## NIH Stroke Scale Comprehensive – Done at 0830

- Level of Consciousness: **Alert** ;
- LOC Questions (Month and Age): **Answers both correctly** ;
- LOC Commands (Open/close eyes and make fist/let go): **Performs both correctly** ;
- Best Gaze (Eyes open, follows examiner's fingers/face): **Normal** ;
- Visual (Introduce visual stimulus to patient's visual field quadrants): **Partial hemianopia (blind)**
- Facial Palsy (Show teeth, raise eyebrows, and squeeze eyes shut): **Partial paralysis**
- Motor - Left arm: **Some effort against gravity, drifts hitting bed**
- Motor - Right arm: **No drift**
- Motor - Left leg: **Some effort against gravity, drifts hitting bed**
- Motor - Right leg: **No drift**
- Limb Ataxia (Finger, nose, heel down shin): **Present in one limb**
- Sensory (Pinprick to face, arm, trunk, leg-compare side to side): **Normal**
- Best Language (Name items, describe a picture and read sentences): **Mild to moderate aphasia**
- Dysarthria (Evaluate speech clarity by patient's repeating listed words): **Mild to moderate**
- Extinction and Inattention (Identify neglect or double simultaneous stimuli): **No neglect**

- Total NIH Stroke Scale Score: **10**

# Information obtained from Critical Access Hospital

- Patient able to move extremities, and follow commands at 0839
- Speech is clear at 0839
- + Facial Droop at 0845
- + Headache 3/10 at 0845
- + Dizziness 0845
- EMS Dispatched 0912
- EMS Arrived at CAH 0913
- EMS Depart CAH 0924
  
- Total time at CAH – 64 Mins

# Transfer

- Transfer time from CAH to Altru = 64 Miles
- + Left Side Weakness
- +Facial Droop
- +Slurred Speech
- No deterioration or improvement in status



# Transfer

- Vitals taken every 15 mins
  - BP – 110's/70's
  - HR – 80's
  - SpO2 – 100%
- Oxygen 2 LPM
  - - Necessary?

# EMS Stroke Discussion

- Transfer with out Alteplase
  - Preform Modified NIH assessment prior to transfer
  - NIH every 15 min during transfer
    - Watch for gross as well as subtle changes
  - Vitals every 15 min
  - EMS standard ABC care
    - O2 to keep SpO2 above 94%
  - Documentation
    - Include last known well (down to minute)
    - NIH results
  - Provide report 15 min out
    - Enables stroke team to be ready

# EMS Stroke Discussion

- Transfer after Alteplase administration
  - Vitals every 5 min for 15 min after admin
  - Vitals and modified NIH every 15 min after
  - Preform NIH prior to transfer to establish baseline
  - Watch for changes
    - Improvement
      - Speech improving
      - Extremities improving
      - Facial droop improving
      - Mental Status improving

# EMS Stroke Discussion

- Watch for changes
  - Decline
    - Increasing confusion
    - Aggressiveness
    - Combativeness
    - Unresponsiveness
- EMS standard care
  - O2 to keep SpO2 above 94%
  - Avoid unnecessary IV's, Lab Draws ect
  - Recheck Blood Glucose if change in LOC
- Documentation
  - Include LKW
  - NIH Results
- Provide report 15 min out

# EMS Stroke Discussion

Altru Ambulance					
Alteplase (tPA) Administration Record					
Vitals every 5 minutes for first 15 minutes, then NIH, GCS & Vitals every 15 minutes					
	DATE: _____				
Time _____	Start time of Alteplase (tPA)				
Time _____	every 5 min Vitals	BP _____ / _____	Pulse _____	Resp Rate _____	O,Sats _____
Time _____	every 5 min Vitals	BP _____ / _____	Pulse _____	Resp Rate _____	O,Sats _____
Time _____	every 5 min Vitals	BP _____ / _____	Pulse _____	Resp Rate _____	O,Sats _____
Time _____	every 15 min Modified NIH Stroke Scale & GCS				
	LOC	0=Alert	1=Drowsy, but responds appropriately	2=Stuporous, arouses with difficulty	3=Comatose, unresponsive
	LOC Questions	0=Knows age & month		1=Answers 1 question correctly	2=Does neither correctly
	LOC Commands	0=Opens & closes eyes, makes fist and lets go		1=Does 1 correctly	2=Does neither correctly
	Motor Left (L) Arm	0=No drift		1=Drift but does not touch bed	2=Some effort against gravity
		3=No effort against gravity, some voluntary movement		4=No movement	
	Motor Right (R) Arm	0=No drift		1=Drift but does not touch bed	2=Some effort against gravity
		3=No effort against gravity, some voluntary movement		4=No movement	
	Motor Left (L) Leg	0=No drift		1=Drift but does not touch bed	2=Some effort against gravity
		3=No effort against gravity, some voluntary movement		4=No movement	
	Motor Right (R) Leg	0=No drift		1=Drift but does not touch bed	2=Some effort against gravity
		3=No effort against gravity, some voluntary movement		4=No movement	
	Facial Palsy	0=Normal		1=Minor paralysis (asymmetry on smiling)	2=Partial paralysis (total paralysis)
		3=Complete paralysis of one or both sides			
	Verbal	0=No aphasia		1=Mild to moderate aphasia	2=Severe aphasia
		3=Mute			
	Score of Modified NIH Score (0 to 31)				
	Eye Opening	4=Spontaneous		3=to Speech	2=to Pain
		1=None			
	Verbal	5=Oriented		4=Confused	3=Inappropriate words
		2=Incomprehensible speech		1=None	
	Motor	6=Obeys Commands		5=Minor paralysis	4=Withdraws
		3=Flexion to pain		2=Extension to pain	1=None
	Score of Glasgow Coma scale (0 to 15)				
Time _____	every 15 min Vitals	BP _____ / _____	Pulse _____	Resp Rate _____	O,Sats _____
	Score of Modified NIH Score (0 to 31)				
	Score of Glasgow Coma scale (0 to 15)				
Time _____	every 15 min Vitals	BP _____ / _____	Pulse _____	Resp Rate _____	O,Sats _____
	Score of Modified NIH Score (0 to 31)				
	Score of Glasgow Coma scale (0 to 15)				
Time _____	every 15 min Vitals	BP _____ / _____	Pulse _____	Resp Rate _____	O,Sats _____
	Score of Modified NIH Score (0 to 31)				
	Score of Glasgow Coma scale (0 to 15)				

# Discussion

- Young female presenting with possible stroke
  - Acute onset of symptoms
  - Headache hx but not with complicated features
  - No hx of clotting events or family hx
  - On estrogen OCP and hx of migraines with aura
- Differential:
  - Stroke, complicated migraine, seizure (?), psychogenic
- Recommended urgent transport to Altru
  - Closest facility with TPA capabilities
- CT scan pushed to us
- Glucose was 86

# In Transit

- Sent Via Ambulance ~ 45 minutes away
- Reviewed CT scan prior to her arrival
  - Agreed no acute intraparenchymal findings
  - I had concerns for dense artery sign in right MCA

# CT Image

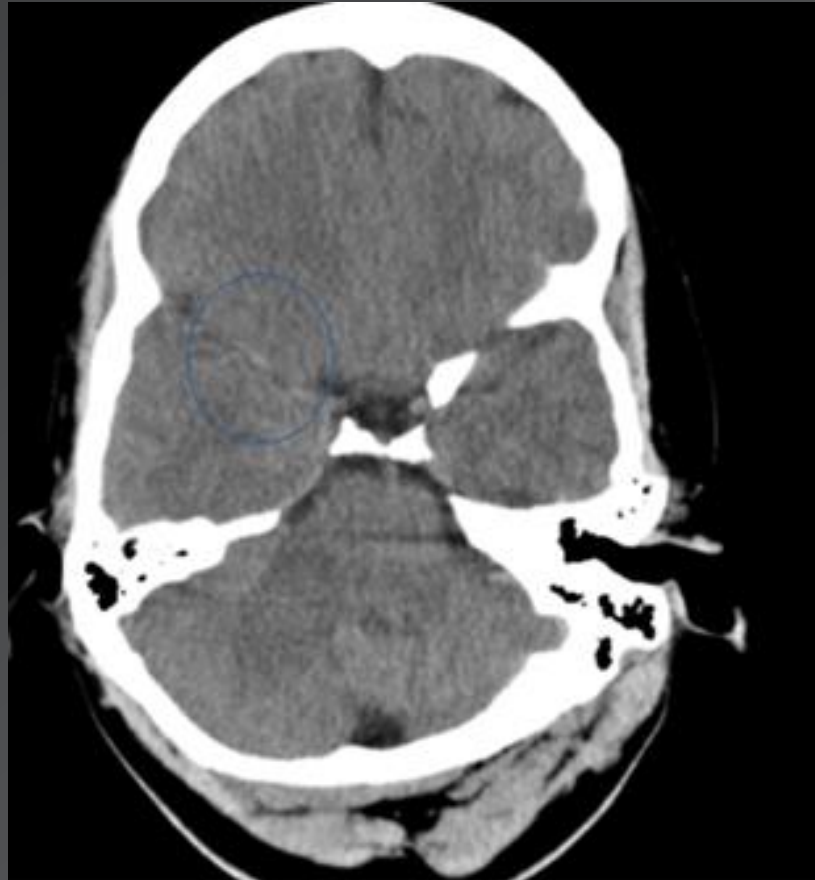




# CT Image



# CT Image



# Altru

- On arrival, still c/o dysarthria and left arm/leg weakness. Husband still noted left facial droop.
  - Thought maybe slightly improved
- Exam:
  - Mental status: slight dysarthria. Favored looking to right
  - CN:left lower facial droop
  - Motor: drift in left arm and leg. Normal right side.
  - Sensory: intact but with extinction on the left side
  - Reflexes: normal
  - Coordination: normal
  - Gait: deferred

# NIH at Altru

## NIH Stroke Scale:

- |     |   |  |
|-----|---|--|
| 1a. | <b>Level of consciousness:</b>            | 0=alert; keenly responsive   |
| 1b. | <b>LOC questions:</b>                     | 0=Performs both tasks correctly  |
| 1c. | <b>LOC commands:</b>                      | 0=Performs both tasks correctly  |
| 2.  | <b>Best Gaze:</b>                         | 0=normal   |
| 3.  | <b>Visual:</b>                            | 0=No visual loss   |
| 4.  | <b><u>Facial Palsy:</u></b>               | 2=Partial paralysis (total or near total paralysis of the lower face)  |
| 5a. | <b><u>Motor left arm:</u></b>             | 2=Some effort against gravity, limb cannot get to or maintain (if cured) 90 (or 45) degrees, drifts down to bed, but has some effort against gravity |
| 5b. | <b>Motor right arm:</b>                   | 0=No drift, limb holds 90 (or 45) degrees for full 10 seconds  |
| 6a. | <b><u>Motor left leg:</u></b>             | 2=Some effort against gravity, limb cannot get to or maintain (if cured) 90 (or 45) degrees, drifts down to bed, but has some effort against gravity |
| 6b. | <b>Motor right leg:</b>                   | 0=No drift, limb holds 90 (or 45) degrees for full 10 seconds  |
| 7.  | <b>Limb Ataxia:</b>                       | 0=Absent   |
| 8.  | <b>Sensory:</b>                           | 0=Normal; no sensory loss  |
| 9.  | <b>Best Language:</b>                     | 0=No aphasia, normal   |
| 10. | <b><u>Dysarthria:</u></b>                 | 1=Mild to moderate, patient slurs at least some words and at worst, can be understood with some difficulty   |
| 11. | <b><u>Extinction and Inattention:</u></b> | 1=Visual, tactile, auditory, spatial or personal inattention or extinction to bilateral simultaneous stimulation in one of the sensory modalities    |

**Total:** 8

# Altru Continued

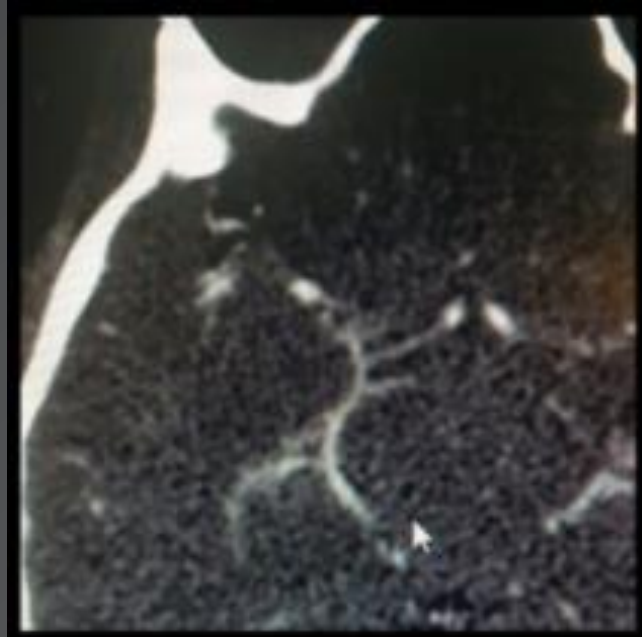
- Primary concerns was for stroke
  - Very focal findings presenting to the right MCA
  - Hard to fake extinction or h/a cause extinction
- Discussed risks and benefits of IV TPA with the patient and husband
  - No contraindications to TPA
    - Glucose 86. head CT okay. BP 125/87.....
  - They were in agreement
  - Treated with IV TPA at 1035
    - ~ 2 hours and 50 minutes post onset of symptoms
    - ~ 20 minutes after arrival

# Altru Continued

- Contacted neuro interventional group
  - Recommended transfer for possible neuro intervention
  - Within 6 hours, stroke scale > 6.....
- Patient and Husband agreeable
- Flight team was immediately available to fly her.

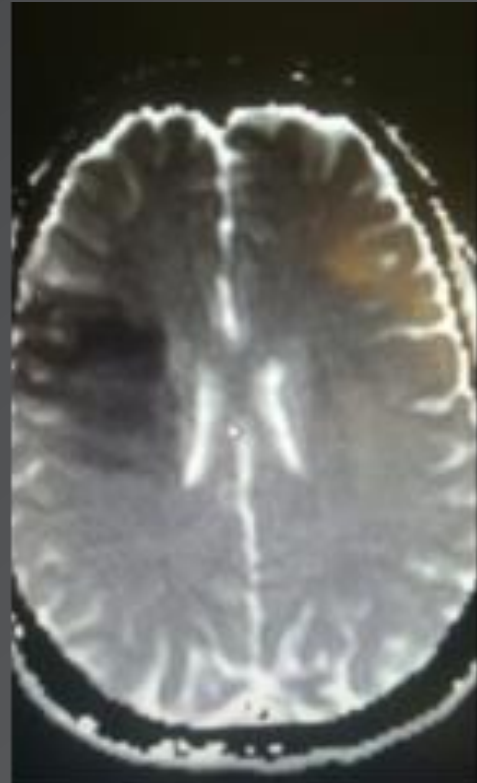
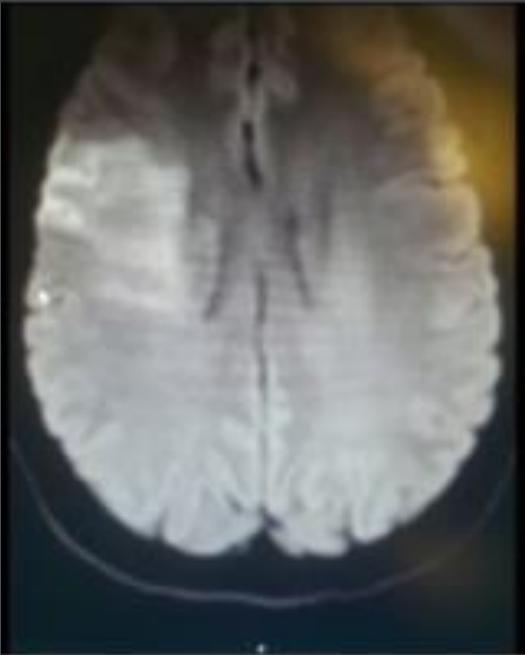
# Neuro Interventional Radiology

- Evaluated at neuro IR facility
- CTA showed right M2 superior division sub occlusive thrombus



# Neuro Interventional Radiology

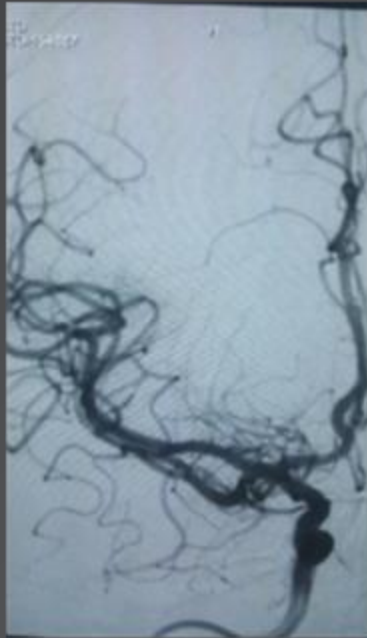
- MRI showed diffusion changes but more MCA territory at risk





# Neuro Interventional Radiology

- Taken to Angio Suite



# Findings

- Sub Occlusion on the Right Middle Cerebral Artery (LMCA-M2); Superior M2 Division
- Complete Recanalization within 49 mins of arriving in Fargo.
- Symptoms impacting the patients left side were reversed on the table!!

# Ongoing

- Worked up completed
- Hematology work up. Found Homozygous PAI-1 4G/5G mutation
  - Placed on Xarelto
- No DVT
- Stopped OCP
- Recommended PFO closure